35774
S/180/62/000/001/010/014
E026/E135

18.1950

AUTHORS: Livshits, B.G., and Osvenskiy, V.B. (Moscow)

TITLE: Study of structural transformations in Ni-Cr-Nb alloys

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Metallurgiya i toplivo, Vol 14, no.1, 1962, 139-146

TEXT: Structural transformations in Ni-Cr-Nb alloys with a Nb content above the limit of its solubility in an Ni-base solid solution have been studied in four alloys containing 9.53-10.50% Cr; 4.82, 7.85, 10.80 and 12.54% Nb; 0.018-0.23% C; remainder Ni, by means of electrical resistivity, hot hardness, microstructure and lattice parameter measurements. Two distinct processes are found to occur; firstly, formation of the K-state (in the 400 to 800 °C range), and secondly, precipitation of the Ni_3Nb phase from the solid solution (in the 700 to 1000 °C range). K-state formation is shown by resistivity maxima at temperatures ranging from 550 to 625 °C for alloys containing from 5-11% Nb.

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Heating at higher temperatures brings about destruction of the K-state and the onset of normal ageing. The kinetics of the ageing process is studied in a 13% Nb alloy. It is found that on ageing at 1000 °C, Ni_3Nb is precipitated as an acicular phase throughout the matrix, probably on the {111} planes. On ageing at 850 °C, however, the second phase is firstly seen as dispersed particles in grain boundary regions, which increase in size as the time of ageing increases, before the acicular pattern is observed throughout the matrix. At 700 °C, even after 100 hours ageing, the precipitate is still only visible in narrow grain boundary regions. The authors suggest that at the lower ageing temperatures, the precipitate within the grains is too fine to be seen under the optical microscope, although the increase in solid solution strength indicates that ageing is taking place. Similar structures are obtained with 8% and 11% Nb alloys, although, as expected, the quantity of precipitate is smaller. There are 4 figures and 2 tables.

SUBMITTED: August 4, 1961

Card 2/2

KEKALO, I.B.; LIVSHITS, B.G.; Prinimala uchastiye: TOVPYGA, O., studentka

Negative △ G-effect and the magnetic internal friction in nickel depending on heat treatment. Fiz. met. i metalloved. 14 no.2:223-230 Ag '62. (MIRA 15:12)

1. Moskovskiy institut stali i splavov.
(Nickel—Heat treatment) (Internal friction)

KUNAKOV, Ya.N.; LIVSHITS, B.G.

Role of surface energy in the formation of cubic texture in silicon iron. Fiz.met.i metalloved. 14 no.5:727-732 N '62. (MIRA 15:12)

1. Moskovskiy institut stali i splavov.
(Iron—Metallography) (Surface energy)

KRIVONOSOVA, Ye.G.; LIVSHITS, B.G.

Anisotropy of the hysteresis of deformed silicon iron crystals. Fiz.met.i metalloved. 14 no.6:930-932 D '62. (MIRA 16:12)

1. Moskovskiy institut stali i splavov.
(Silicon steel--Metallography)
(Hysteresis)

S/776/62/000/025/012/025

AUTHORS: Gorbunov, V.I., Livshits, B.G.

TITLE: On the structure of alloys with $\alpha \rightleftarrows \gamma$ transformation of the systems Fe-Ni and Fe-Co-V.

SOURCE: Moscow. Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii. Sbornik trudov, no. 25. Moscow, 1962. Pretsizionnyye splavy. pp. 177-188.

TEXT: The paper describes an experimental investigation of Fe-Ni alloys with an elevated Fe content and alloys of the system Fe-Co-V containing more than 30% Co, which are commonly referred to as the "irreversible" alloys. During continuous heating and cooling the $\alpha \rightleftarrows \gamma$ transformation occurs with an appreciable T hysteresis which increases with an increase of the alloying-component content. Depending on the heat treatment, the phase state of the irreversible alloy is described by 2 phase diagrams: A metastable phase diagram and an equilibrium phase diagram. Following a brief survey of the state of the art, the paper adduces the results of an investigation of the structure of annealed Fe-Ni and Fe-Co-V alloys in which the $\gamma \rightarrow \alpha$ transformation during continuous cooling occurs at relatively elevated T (appx. above 400°C). The investigation comprised the two-phase binary alloys with a Ni content of from 5 to 10% and two-phase ternary alloys with a V content of rom

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2 to 5% and a constant Co content of 52%. The chemical composition of the alloys selected is tabulated. The investigation was performed by means of electron and optical microscopy and by dilatometry and X-ray analysis as described by I. L. Aptekar', V. I. Gorbunov, Fiz. Metall. i metalloved., v.10, no.5, 1960, 710. The metastable phase diagram of the Fe-Ni system and the vertical section of the metastable phase diagram of the system Fe-Co-V with 50% Co are employed to show the changes in structure in the course of a slow cooling from the temperature of the single-phase γ solid solution to room T for alloys of different compositions. A comparison of the slow cooling process investigated here and the fast cooling and isothermal processes reported in the literature shows that the observed changes in structure of the alloys Fe-Ni and Fe-Co-V during slow cooling are the result of the superimposition of processes which proceed with and without changes in composition. The results of the present investigation should serve usefully in the selection of suitable heat-treatment regimes for practical purposes. There are 7 figures and 10 references (3 Russian-language, 3 German, and 4 English-language).

S/048/62/026/002/022/032
B117/B138

AUTHORS: Kekalo, I. B., and Livshits, B. G.

TITLE: Damping capacity method of studying magnetic diffusion effect in invar

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 2, 1962, 279-283

TEXT: The present paper was presented at a conference on magnetism and antiferromagnetism and is devoted to a study of the peculiar behavior of damping capacity in invar. The experiments were carried out in a vacuum relaxion oscillator type РКФ-МИС (RKF-MIS) (elastic vibrations of approximately 0.5 cps.). All specimens were annealed with two hr cooling from 800°C to room temperature. Damping capacity Q^{-1} was found to decrease gradually with isothermal soaking at temperatures below Curie point (maximum decrease from 80-100°C). This effect was stronger in high-(0.26 % C) than in low-carbon invar (0.02 % C). Besides this carbon causes the maximum drop at lower temperatures. Transition from one point to another on the stabilized curve does not take place directly on heating through 20-30°C, but with a rise and fall. If a stabilized specimen

Card 1/2

LIVSHITS, Boris Grigor'yevich; BUNIN, K.P., prof., retsenzent; VINOGRAD, M.I., kand. tekhn. nauk, st. nauchn. sotr., retsenzent; MOLOTILOV, B.V., red.; BERLIN, Ye.N., red. izd-va; KARASEV, A.I., tekhn. red.

[Metallography] Metallografiia. Moskva, Metallurgizdat, 1963. 422 p. (MIRA 16:10)

1. TSentral'nyy nauchno-issledovatel'skiy institut shelkovoy promyshlennosti (for Vinograd).
(Metallography)

S/148/63/000/001/018/019
E193/E383

AUTHORS: Lakhman, N.G. and Livshits, B.G.

TITLE: Changes in some physical properties of the alloy Ю14Г3 (Yu14G3)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Chernaya metallurgiya, no. 1, 1963, 147 - 152

TEXT: The addition of Mn to the Fe-14% Al alloy brings about a considerable improvement in its plastic and magnetic properties. Since little is known of the effect of Mn additions on the solid-state transformations in the alloy studied, the present investigation was undertaken. The analysis of the material used in the experiments was as follows: 14.75% Al, 3.06% Mn, 0.02% C, 0.004% S, 0.011% P, 0.10% Si, 0.0098% N_2 - no traces of Cr, Ni or Cu. The experimental work comprised determination of the temperature-dependence of the Young modulus and saturation magnetization and a study of the kinetics of the change in hardness and electrical resistivity during heating of specimens preliminarily water-quenched after heating in vacuum to 900 °C. Some experiments were conducted on forged specimens. The test temperature ranged

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Changes in some ....

from 150 - 900 °C. The results can be summarized as follows: 1) the Young modulus E of specimens quenched from 900 °C decreased on subsequent heating, the slope of the ΔE/temperature curve increasing at about 300 °C; E remained constant in the 500 - 700 °C interval, decreasing again at higher temperatures; E gradually increased on cooling, returning to its initial value at room temperature. 2) A sharp deflection at 300 °C was observed on curves representing the temperature-dependence of saturation magnetization of forged specimens, both during the first and subsequent heating; the Curie point of the Yul4G3 alloy determined from these curves was about 340 °C. 3) The electrical resistivity of the forged specimens increased on heating, reached a maximum at about 480 °C and then decreased again; a similar curve was obtained on cooling but the room temperature-resistance was lower than that before the test. 4) The effect of isothermal ageing at various temperatures on the hardness and electrical resistance of the alloy at room temperature is demonstrated in Fig. 4. In Fig. 4a, $\Delta R/R_{30K}$ (%) , where R_{30K} is the electrical resistance after quenching and ΔR the change in R after ageing,

Changes in some ....

is plotted against the ageing temperature, the various curves relating to specimens aged for 5 min (circles), one hour (crosses), five hours (squares) and twenty hours (triangles); in Fig. 4, the increase in hardness ($\Delta H/H$, %) is plotted against the ageing temperature, the ageing time being 5 min (circles), 15 min (crosses) and one hour (triangles). Conclusions: 1) The increase in hardness and decrease in electrical resistance observed on ageing preliminarily quenched specimens can be attributed to a disorder-order transformation. 2) The addition of Mn to the Fe-14% Al alloy has a disordering effect. 3) The anomalous decrease in R on heating above 500 °C, its increase after ageing at temperatures above 500 °C and constant value of R in the 500 - 700 °C interval indicate the existence of another, high-temperature transformation associated with the redistribution of atoms in the alloy studied. There are 4 figures.

ASSOCIATION: Moskovskiy institut stali i splavov
(Moscow Institute of Steel and Alloys)

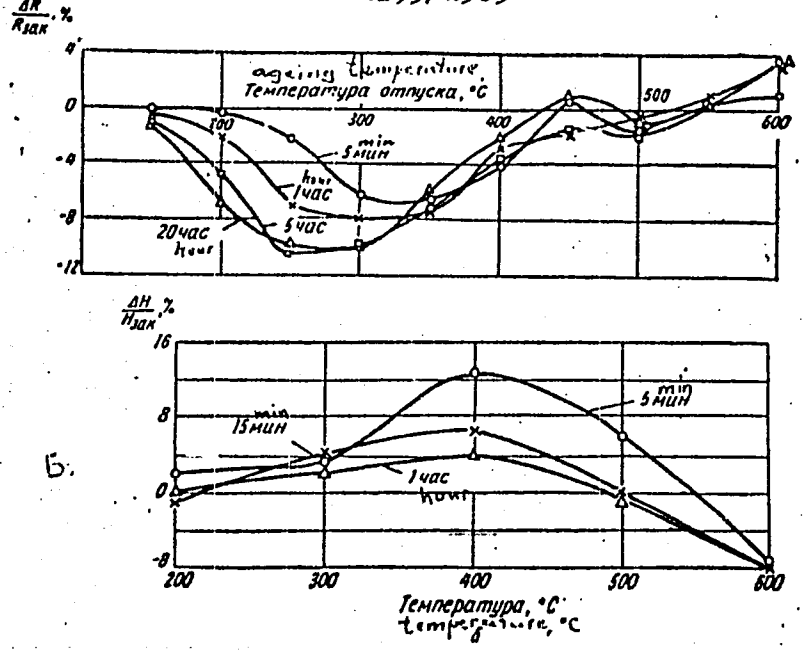
SUBMITTED: November 2, 1961

Card 3/4

S/148/63/000/001/018/019.
E193/E383

Changes in some ...

Fig. 4:



Card 4/4

S/148/63/000/003/006/007
E111/E435

AUTHORS: Krivonosova, Ye.G., Livshits, B.G., Molotilov, B.V.

TITLE: Influence of tempering on the domain structure of deformed single crystals of silicon iron

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, no.3, 1963, 144-147

TEXT: During plastic deformation (of the order of 1%) of a crystal of iron-silicon alloy, the domain structure on the (110) plane was preserved. In the present work the stability of such a structure, with "decoration" of dislocations concentrated in slip planes, is considered. A large series of crystals of 3% iron-silicon alloy (with about 0.01% carbon), obtained by recrystallization at 1150°C for 24 hours, were studied. The crystals were 1.5% deformed by stretching in the [001] direction and the plane parallel to the (1$\bar{1}$0) crystallographic plane was examined before and after tempering at 400°C for 30 minutes. This tempering produced no redistribution of dislocations but caused a rearrangement of the domain structure. This rearrangement is due to precipitation of carbon on dislocations concentrated in slip planes.

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Slip planes "decorated" with carbon are a substantial demagnetizing obstacle in the path of the magnetic flux. The rearrangement changes the anisotropy of the coercive force: after tempering the direction of easy magnetization will be that perpendicular to [001], this direction itself no longer being "easy". This effect was also observed after 5% deformation and tempering. There are 5 figures.

ASSOCIATION: Moskovskiy institut stali i splavov i institut pretsizionnykh splavov im. Bardina
(Moscow Institute of Steel and Alloys and Institute of Precision Alloys imeni Bardina)

SUBMITTED: November 16, 1962

KUNAKOV, Ya.N.; LIVSHITS, B.G.; SOROKIN, M.N.

Deformation of textures in silicon iron. Izv. vys. ucheb. zav.; chern. met. 6 no.5:146-150 '63. (MIRA 16:7)

1. Moskovskiy institut stali i splavov.
(Iron-silicon alloys—Metallography)
(Deformation (Mechanics))

S/185/63/008/002/010/012
D234/D308

AUTHORS: Livshits, B. G. and Rymashevskiy, G. A.

TITLE: Variation of Debye's characteristic (elastic) temperature during ordering of A_3B type alloys

PERIODICAL: Ukrayins'kyy fizychnyy zhurnal, v. 8, no. 2, 1963, 243-247

TEXT: The authors computed the elastic characteristic temperature using a method proposed by V. I. Korotkov and B. N. Finkel'shteyn, for Ni_3Fe, Ni_3Mn and $CoNi_3$ alloys in hardened and annealed or tempered state. Conclusions: The characteristic temperature increases with the ordering, its variation being proportional to the square root of the increase of Young's modulus. At initial stages of ordering of Ni_3Mn alloy, and increase of specific electric resistance is observed; at high temperatures it is replaced by a decrease. There are 2 figures and 5 tables.

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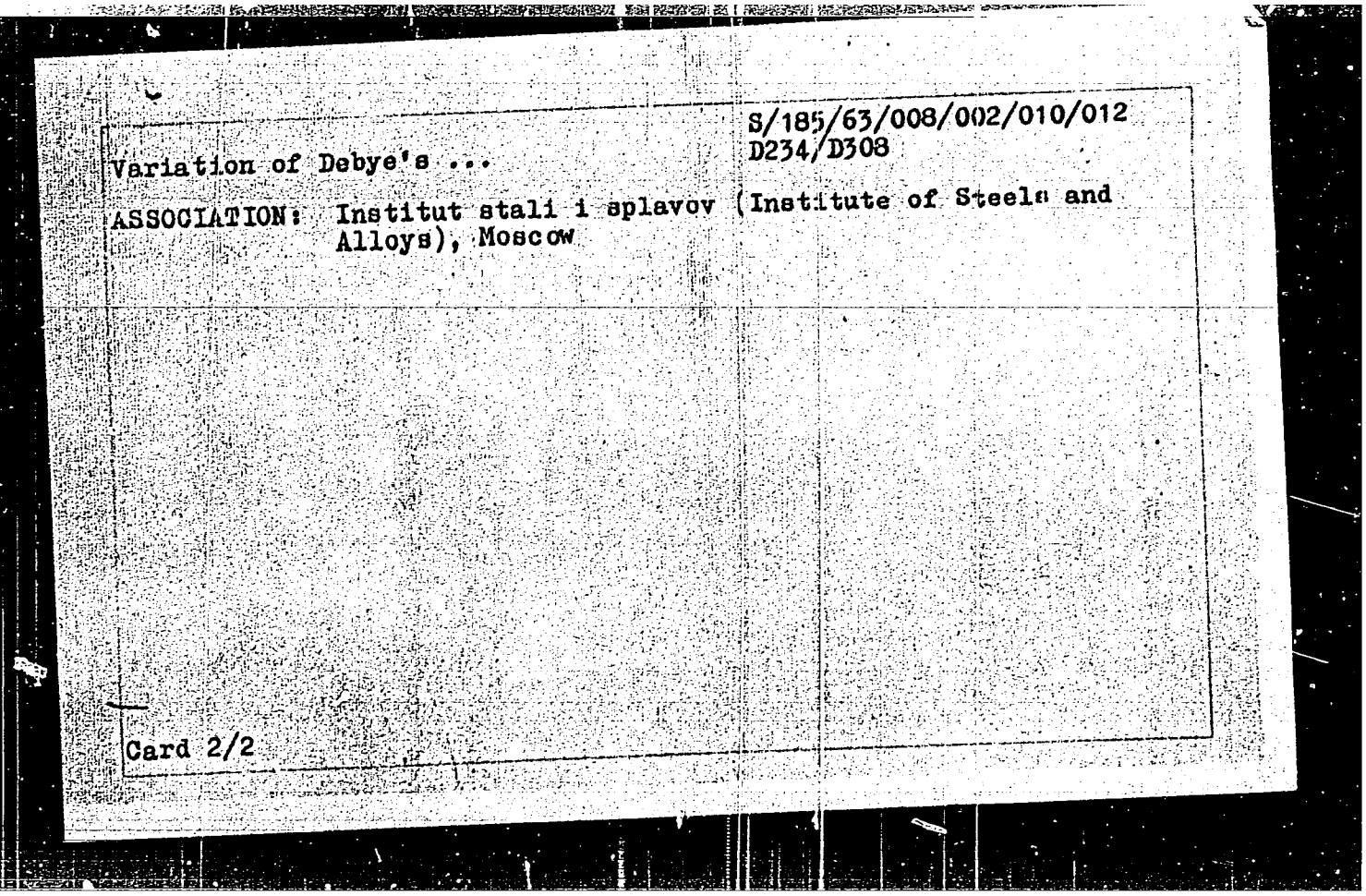

S/185/63/008/002/010/012
D234/D308

Variation of Debye's ...

ASSOCIATION: Institut stali i splavov (Institute of Steels and Alloys), Moscow

Card 2/2

KUNAKOV, Ya.N.; LIVSHITS, B.G.

Cubic texture in silicon iron. Metalloved. i term. obr. met. no.11:15-19 N '63. (MIRA 16:11)

1. Moskovskiy institut stali i splavov.

KUMAKOV, Ya.N.; LIVSHITS, B.G.

Magnetic properties of transformer steel with cubic texture. Fiz.met.i metalloved. 15 no.1:55-59 Ja '63. (MIRA 16:2)

1. Moskovskiy institut stali i splavov.
(Steel—Magnetic properties)

LIVSHITS, B.G.; NOVIKOV, V.Yu.

Studying the kinetics of secondary recrystallization in transformer steel. Fiz.met.i metalloved. 15 no.3:458-561 Mr '63. (MIRA 16:4)

1. Moskovskiy institut stali i splavov.
(Steel—Metallography) (Crystallization)

L 13405-63 BDS/EWT(1)/EEC(b)-2 AFFTC/ASD/ESD-3 IJP(C)

ACCESSION NR: AP3000092 S/0126/63/015/004/0497/0503

AUTHOR: Krivonosova, Ye. G.; Livshits, B. G.

TITLE: Cold-hardening effect upon the coercive force of iron silicide monocrystals

SOURCE: Fizika metallov i metallovedeniye, v. 15, no. 4, 1963, 497-503

TOPIC TAGS: cold-hardening effect, coercive force anisotropy

ABSTRACT: The coercive force anisotropy in the annealed and deformed monocrystals of a 3% iron silicide has been studied. The samples were deformed by stretching in the [001] direction and annealed at temperatures ranging from 130-1200C. The dislocation structure on the plane (110) has been investigated. The results obtained for the basic crystallographic directions were tabulated and an attempt was made to correlate the experimental results obtained with the theoretical conclusions of F. Vicena and other investigators of plastic deformation effect upon metal magnetic properties. The authors conclude that the magnitude of anisotropy in toroidal samples is approximately equal to the fourth root of relative sample elongation. The nature of the coercive force anisotropy (H sub c) in etched nondeformed crystals as well as in the annealed and stretched samples corresponds to the relation 1 of Enclosure 1. Plastic strain in the [001] direction originates

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L 13405-63
ACCESSION NR: AP3000092

anisotropy which is characterized by the relation 2 of Enclosure 1. The annealing of deformed crystals (with a magnetic protection) at the temperatures from 350-550C decreases anisotropy and increases the magnitude of coercive force in the /001/ direction. A decrease in dislocation densities during the annealing of deformed crystals is accompanied by a decrease in coercive force. Orig. art. has: 4 formulas, 1 table, and 6 figures.

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Steel and Alloys Institute)

SUBMITTED: 07Jul62 DATE ACQ: 12Jun63 ENCL: 01

SUB CODE: 00 NO REF SOV: 005 OTHER: 007

Card 2/2

LIVSHITS, B.G.; NOVIKOV, V.Yu.

Origin of secondary recrystallization nuclei in transformer stee. Fiz. met. i metalloved. 16 no.6:862-866 D '63. (MIRA 17:2)

1. Moskovskiy institut stali i splavov.

AFANAS'YEVA, M.T.; LIVSHITS, B.G.; RYMASHEVSKIY, G.A.

Phase transformations in transformer steel during tempering. Izv. vys. ucheb. zav.; chern. met. 7 no.3:131-135 '64. (MIRA 17:4)

1. Moskovskiy institut stali i splavov.

KEKALO, I.B.; LIVSHITS, B.G.

Response to remarks made by K. Mishek. Fiz. met. i metalloved. 17 no. 2:298-300 F '64. (MIRA 17:2)

1. Moskovskiy institut stali i splavov.

ACCESSION NR: AP4023410 S/0048/64/028/003/0580/0583

AUTHOR: Krivonosova, Ye.G.; Livshits, B.G.

TITLE: Effect of deformation on the anisotropy of the coercive force of Si iron single crystals [Report, Symposium on Ferromagnetism and Ferroelectricity held in Leningrad 30 May to 5 June 1963]

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v.28, no.3, 1964, 580-583

TOPIC TAGS: silicon iron, coercive force, silicon iron coercive force, coercive force anisotropy, deformation coercive force influence, deformation domain structure influence

ABSTRACT: Two types of anisotropy of the coercive force have been reported for silicon iron: $H_{c\langle 100\rangle} < H_{c\langle 110\rangle} < H_{c\langle 111\rangle}$ (type 1), and $H_{c\langle 100\rangle} < H_{c\langle 111\rangle} < H_{c\langle 110\rangle}$ (type 2). The present investigation of the effect of plastic deformation and anneal on anisotropy of the coercive force, and magnetic structure, was undertaken in order to clarify this situation. Sheets of coarse grained transformer steel containing 3% Si were given a (110) [001] orientation by cold rolling and a 24 hour high temperature vacuum anneal. Small plates consisting of several highly oriented crystals were cut from the sheets

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ACCESSION NR: AP4023410

for investigation. The crystals were subjected to plastic deformation by tension in the [001] direction. Bands were etched in different directions on the exposed (110) face of the deformed crystals, and the coercive force in these bands was measured with an astatic magnetometer. The dislocation structure was examined by means of a metallurgical microscope, and the magnetic structure was observed with magnetic suspensions. The anisotropy of the coercive force of the undeformed crystals was of type 1. After deformation, the anisotropy was of type 2 and much greater than before. The deformed crystals had a type "A" magnetic structure with the domain walls and the magnetization within the domains in the [001] direction. Regular rows of etch pits, representing dislocations, appeared in the directions of intersection of slip planes with the crystal surface. Annealing at 350 to 550° in zero field environment increased the coercive force in the [001] direction and decreased it in the $[1\bar{1}0]$ direction. The anisotropy was thereby greatly decreased, but it remained of type 2. The authors suggest that [001] ceases to be an easy magnetization direction during the anneal because of the resistance to magnetic flux offered by the slip planes. The dislocation distribution remained unaffected by the low temperature anneal, but the domain structure was reconstituted. Dense deposits of magnetic suspension appeared along directions parallel to the slip planes. These represent magnetic poles in regions of increased dislocation density, rather than domain walls. Annealing

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ACCESSION NR: AP4023410

at 700° led to a further decrease of the coercive force anisotropy which, however, remained of type 2. A lamellar polygonal structure appeared, and the dislocation rows reoriented themselves perpendicularly to the slip direction. Annealing at 1200° resulted in a return to type 1 anisotropy and a reduction of the dislocation density. Orig.art.has: 2 formulas and 3 figures.

ASSOCIATION: none

SUBMITTED: 00

DATE ACQ: 10Apr64

ENCL: 00

SUB CODE: PH

NR REF SOV: 005

OTHER: 005

Card 3/3

L 15721-65 EWT(m)/EWP(w)/EWA(d)/EWP(t)/EWP(k)/EWP(b) Pf-4 ASD-3/AFTC/ESD-3/
IJP(c)/ESD(gs)/ESD(t)/SSD/BSD/AFWL/ASD(a)-5/ASD(f)-2/ASD(m)-3/AS(mp)2 JD/HW
ACCESSION NR: AR4045181 S/0137/64/000/007/I035/I035

SOURCE: Ref. zh. Metallurgiya, Abs. 7I221

AUTHOR: Kokalo, I. B.; Livshits, B. G.; Morgner, V.; Sokolov, A. Yu.

TITLE: Effect of deformation and magnetic effects on the internal friction of iron

CITED SOURCE: Sb. Relaksats. yavleniya v mat. i splavakh. M., Metallurgizdat, 1963, 176-183

TOPIC TAGS: deformation, magnetic effect, internal friction, iron, domain boundary, ferromagnetism

TRANSLATION: Transitory instability of Armco iron and electrolytic iron samples was investigated in various initial states (after demagnetization by a changing field, in a state of residual induction, and after elastic deformation). Study was also made of the recovery of stabilized internal friction brought about by losses due to magnetic hysteresis, as a result of magnetic and deformation (exposure to and removal from elastic stress) effects. Internal

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L 15721-65
ACCESSION NR: AR4045881

friction was measured with an inverted low frequency torsion pendulum at temperatures from -196 to +100°. In the study of Fe annealed in H_2 (in this case there were losses due to magnetic hysteresis), instability was found in the temperature interval from -40 to +5°. Outside this interval, the internal friction of Fe was stable, independent of the initial state of the sample. Instability of internal friction is observed in samples subjected to magnetic (constant and changing field) and deformation effects. An increase in internal friction, as a result of deformation effects, leads to approximately the same level independent of the initial state of the sample, including the state following stabilization of internal friction. The high residual value of internal friction in Fe annealed in H_2 is connected with losses due to magnetic hysteresis, determined by heterogeneous displacements of the domain boundaries under the effect of external elastic stresses. The decrease of internal friction with the passage of time is explained by the redistribution of foreign atoms, as a result of which there comes about a blocking of the domain boundaries and a decrease in losses due to magnetic hysteresis. 10 literature titles.

SUB CODE: MM, AS ENCL: 00
Card 2/2

L 15720-65 EWT(m)/EWP(w)/EWA(d)/EWP(t)/EWP(k)/EWP(b) Pf-4 ASD-3/AFFTC/ESD-3/
LIP(c)/ESD(t)/ESD(ga)/ESD(t)/SSD/RSD/AFWL/ASD(a)-5/ASD(f)-2/ASD(m)-3/AS(mp)-2 JD/
mr

ACCESSION NR: AR4045883 S/0137/64/000/007/I035/I036

SOURCE: Ref. zh. Metallurgiya, Abs. 7I223

AUTHOR: Kekalo, I. B.; Livshits, B. G.; Morgner, V. B

TITLE: The effect of elastic deformation and certain magnetic effects on the internal friction of iron

CITED SOURCE: Sb. Relaksats. yavleniya v met. i splavakh. M., Metallurgizdat, 1963, 190-197

TOPIC TAGS: elastic deformation, magnetic effect, internal friction, iron, domain boundary, ferromagnetism, temperature dependence

TRANSLATION: Investigations were made on wire samples made of Armco iron and electrolytic iron. Internal friction was measured with an inverted low frequency torsion pendulum; deformation on the surface of the sample was $6 \cdot 10^{-5}$. The character of the temperature dependence of the internal friction of both kinds of Fe samples depends hardly at all on magnetization. Refining the Fe leads to a sharp increase in residual internal friction (approximately 3 times) and to the

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L 25726-65

ACCESSION NR: AR4045883

appearance of a dependence of internal friction on magnetization. This increase in residual internal friction is explained by the fact that refining decreases the total amount of impurities in the Fe and renders easier the displacement of domain boundaries by the effect of external stresses, and this in turn leads to an increase in losses due to magneto-elastic hysteresis. An amplitude dependence of internal friction is observed only in the case of Fe annealed in H_2. In the case of annealed samples, a reversible effect of the influence of preliminary elastic deformation on internal friction is observed. At a given temperature, internal friction depends not only on preliminary deformation, but also on the type of magnetic effect. The change in internal friction effected by preliminary deformation is not connected with plastic deformation, but is determined by magneto-elastic processes and appears reversible in relation to magnetic effects. 15 literature titles.

SUB CODE: MM, AS ENCL: 00

Card 2/2

LIVSHITS, B.G.; SIDOROV, N.A.

Heat stability of carbides and form of the graphite in heat treated cerium cast iron. Lit.proizv. no.7:24-26 Jl '64.
(MIRA 18:4)

LIVSHITS, B.G.; NOVIKOV, V.Yu.; TOLSTOVA, T.Yu.

Determining the surface energy of grains in transformer steel of various purity. Fiz. met. i metalloved. 18 no.4:580-583 O '64. (MIRA 18:4)

1. Moskovskiy institut stali i splavov.

EWT(l)/EWG(v)/EWP(t) IJP(c) JD/HW/ASD(a)-5/AFWL/RAEM(t) MJW/JD/HM

ACCESSION NR: AP4044868 S/0126/64/018/001/0051/0058

AUTHOR: Livshits, B. G.; Shtefan, M.; Khalin, L. A.

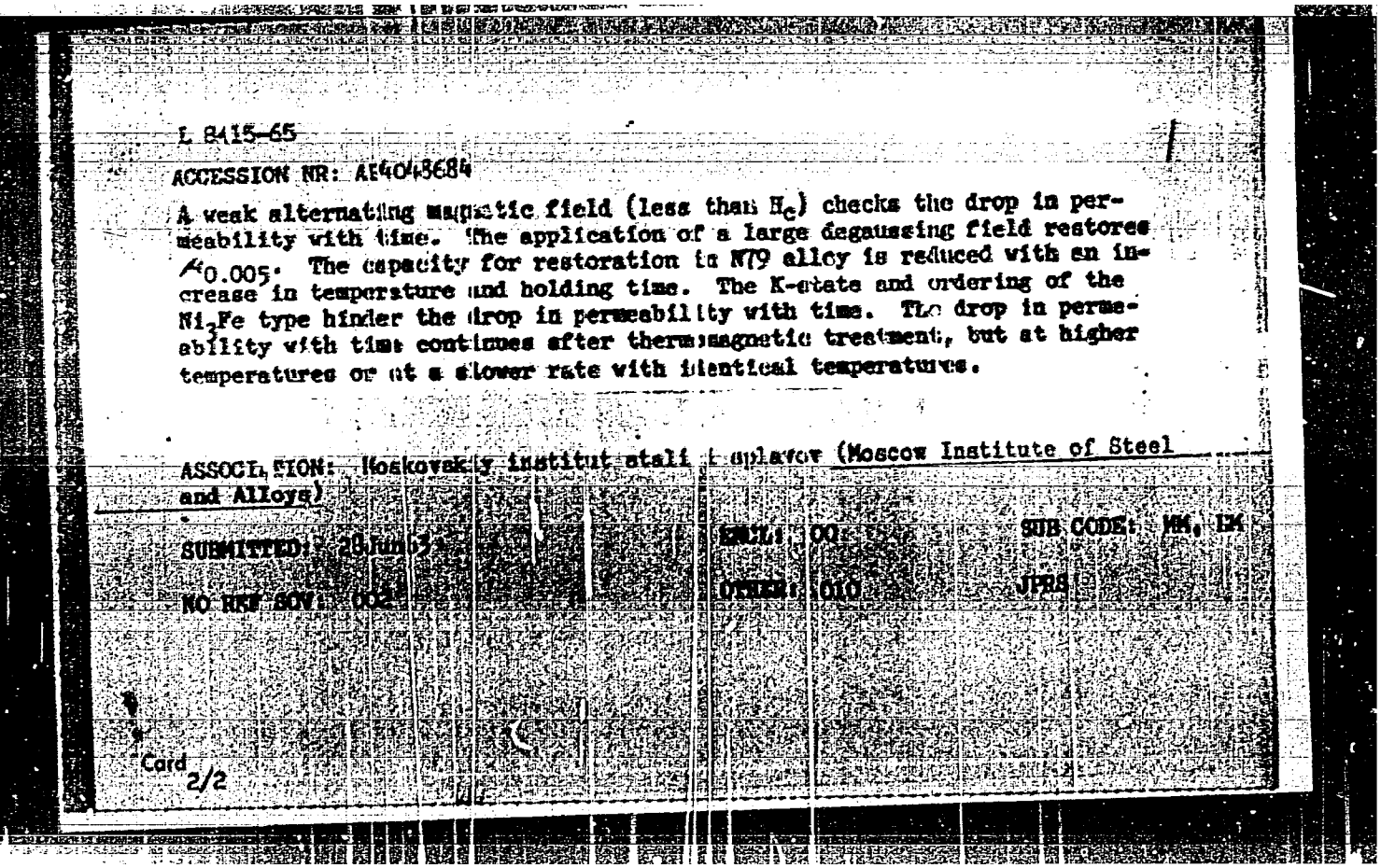
TITLE: Drop in permeability with time for N79, N79ML and N79M4 alloys

SOURCE: Fizika metallov i metallovedeniye, v. 8, no. 1, 1964, 51-38

TOPIC TAGS: permeability, alloy, nickel base alloy, weak magnetic field, iron, alterating field/ N79 alloy, N79ML alloy, N79M4 alloy

Abstract: A study is made of the drop in permeability with time in weak fields at high temperatures for N79, N79ML and N79M4 alloys in various states (after quenching, annealing and thermomagnetic treatment). It is observed that the rate of the fall in permeability with time depends on the temperature, composition and state of the alloy and also on the magnitude of the applied alternating field. The results are explained on the basis of the theory of directed ordering. The drop in permeability with time continues through periods when the temperature is held constant is generated by an increase in temperature and has a diffusion character.

Card 1/2



L 8415-65

ACCESSION NR: AP4043684

A weak alternating magnetic field (less than H_c) checks the drop in permeability with time. The application of a large degaussing field restores $\mu_{0.005}$. The capacity for restoration in N79 alloy is reduced with an increase in temperature and holding time. The K-state and ordering of the Ni_3Fe type hinder the drop in permeability with time. The drop in permeability with time continues after thermomagnetic treatment, but at higher temperatures or at a slower rate with identical temperatures.

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys)

SUBMITTED: 28Jun63 ENCL: 00 SUB CODE: MM, EM

NO REF SOV: 002 OTHER: 010 JPRS

Card 2/2

LIVSHITS, B.G.; KHALIN, L.A.

Nature of the temporary drop of permeability in Permalloy-type alloys. Izv. vys. ucheb. zav.; chern. met. 7 no.11: 147-148 '64. (MIRA 17:12)

1. Moskovskiy institut stali i splavov.

L 53687-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(b)/EWA(c) IJP(c) JD/JG

ACCESSION NR: AP5008788 S/0126/65/019/003/0375/0379

539.22:669.35

23
21
B

AUTHOR: Livshits, B. G.; Litvinov, Yu. N.; Sumin, V. I.

TITLE: Analysis of ordering in copper-base alloys

SOURCE: Fizika metallov i metallovedeniye, v. 19, no. 3, 1965, 375-379

TOPIC TAGS: copper base alloy, metal electrical property, ordered alloy

ABSTRACT: The electrical properties of solid solutions of gallium (10, 12, and 16% by wt.) in copper are studied in relation to the tempering temperature after quenching from 800°C with fixation in water. The Hall constant, absolute differential thermal emf, and resistivity are measured in the interval from room temperature to 100°C. It was found that a transformation occurs in the 200-700°C interval of tempering temperatures which changes the properties of alloys located in the single-phase region of the copper-gallium equilibrium diagram. One explanation suggested for these changes is that quenching from high temperatures creates a higher degree of short-range order than tempering. The order is the result of atomic redistribution by residual vacancies. Another explanation suggested is that quench-

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L 53687-65

ACCESSION NR: AP5008783

ing statistically fixes the unordered distribution of atoms in a lattice whereas tempering stabilizes the low-temperature state. It is assumed that there is a high non-equilibrium concentration of vacancies in alloys quenched in water from high temperatures. The activation energy of the vacancies was considerably lower in these alloys than the corresponding value for copper. Orig. art. has: 4 figures.

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys)

SUBMITTED: 28Apr64 ENCL: 00 SUB CODE: MM, NP

NO REF SOV: 003 OTHER: 007

Card 2/2

AVRAAMOV, Yu.S.; GVOZDEV, A.G.; LIVSHITS, B.G.

Diffusive creep of a single crystal of transformer steel. Izv. vys. ucheb. zav.; chern. met. 8 no.11:121-124 '65. (MIRA 18:11)

1. Moskovskiy institut stali i splavov.

PANCHENKO, Ye.V.; PANSHINA, M.M.; KEKALO, I.B.; BLINKOVA, T.M.; KRYLOVA, L.I.; ZHDANOV, V.V.; ZHEVTUN, N.P.; LYUSHUS, R.O.

Residual stresses in billets made of AISI steel. Stan. i instr. 36 no.8:27-29 Ag '65. (MIRA 18:9)

AVRAAMOV, Yu.S.; GVOZDEV, A.G.; LIVSHITS, B.G.

Surface energy of single crystals of the Fe - 3% Si alloy.
Izv. vys. ucheb. zav.; chern. met. 8 no.9:142-145 '65.
(MIRA 18:9)

1. Moskovskiy institut stali i splavov.

LIVSHITS, B.G.; LITVINOV, Yu.M.; SUMIN, V.I.

Studying ordering in copper-base alloys. Fiz. met.i metalloved. 19 no.3:375-379 Mr '65. (MIRA 18:4)

1. Moskovskiy institut stali i splavov.

PANCHENKO, Yelena Vasil'yevna, dots.; SKAKOV, Yuriy Aleksandrovich, dots.; KRIMER, Boris Isaakovich, dots.; ARSENT'YEV, Petr Pavlovich, dots.; TSVILING, Mira Yakovlevna, assistent; POPOV, Konstantin Viktorovich, dots.; Prinimala uchastiye SHARSHATKINA, A.V.; LIVSHITS, B.G., doktor tekhn. nauk, prof., red.

[Metallographic laboratory] Laboratoriia metallografii. Moskva, Metallurgiia, 1965. 439 p. (MIRA 18:9)

L 40907-66 EWT(m)/T/EWP(t)/ETI IJP(c) JD

ACC NR: AP6030182 SOURCE CODE: UR/0148/66/000/005/0152/0153

AUTHOR: Livshits, B. G.; Linetskiy, Ya. L.

ORG: Moscow Institute of Steel and Alloys (Moskovskiy institut stali i splavov)

TITLE: Study of the structure of magnetic alloy YuNDK35T5

SOURCE: IVUZ. Chernaya metallurgiya, no. 5, 1966, 152-153

TOPIC TAGS: magnetic alloy, metal crystal, crystal lattice structure, thermomagnetic effect, alloy heat treatment/YuNDK35T5 magnetic alloy

ABSTRACT: In the literature there are little, and contradictory, data on the structure of alloy YuNDK35T5 in the equilibrium state at 700-800°C.

In this work specimens cut from the single crystal which had the following composition were investigated: 15.5% Ni; 36.5% Co, 6.9% Al, 5.2% Ti, 3.5% Cu, 0.2% C and the remainder, iron. After tempering at 700°C for 100 hours, reflections from the following phases were observed on the roentgenogram: I, (b.c.c.) a = 2.985Å; II, (b.c.c.) a = 2.863Å; III, (f.c.c.) a = 3.60Å. The basic reflections from the b.c.c. phase with the smaller lattice period (a = 2.863Å) are more intense than from the b.c.c. lattice with the larger period (a = 2.895Å); the ratio of intensities of the superlattice reflections are reversed. For the phase with the larger period (a = 2.895Å/2 = 5.790Å) superlattice reflections of the (111), (311), and (511) lines are observed which are characteristic for superlattices of the Fe_3Al type as well as superlattice reflections common for both types of ordering (NiAl and Fe_3Al).

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UDC: 669.24'25'295:620.183.48

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L 07115-67 EWT(m)/EWP(t)/ETI IJP(c) JD.

ACC NR: AP6032852 (N) SOURCE CODE: UR/0020/66/170/003/0554/0556

AUTHOR: Livshits, B. G.; Linetskiy, Ya. L.; Milyayev, I. M.

ORG: Moscow Institute of Steel and Alloys (Moskovskiy institut stali i splavov)

TITLE: A study of the crystal structure of metastable phases in Ticonal alloy

SOURCE: AN SSSR. Doklady, v. 170, no. 3, 1966, 554-556

TOPIC TAGS: ticonal, crystal structure, crystal lattice parameter, phase transformation, tempering, thermomagnetic treatment, x ray diffraction, x ray study

ABSTRACT: An x-ray study was made on conjugate intermediate phases in single crystals of a Ticonal alloy having a standard composition (YuNDK35TS) after quenching and tempering, and after thermomagnetic treatment. The thermomagnetic treatment was as follows: samples were held 10-15 min at 1250°C, transferred to an 800°C lead bath where they were held in a magnetic field and air cooled. Solid solution decomposition occurred in the magnetic field at a stress vector of [001]. Rotating and oscillating x-ray patterns were obtained from single crystals 1 mm in diameter. After quenching and tempering for 1 min at 800°C, the rotating x-ray patterns exhibited sharp asymetrical halos around the principal and superstructural reflections, indicating simultaneous periodicities in the scattering factors and the interplanar spacings. The period of modulation L was 82 a_{av} after 1 min at 800°C (a_{av} = 2880 ± 0.001 Å), while after 4 min

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ACC NR: AP6032852

L increased to 100 α_{av}. Tempering for 12 min resulted in x-ray reflections from β and β_2 tetragonal phases: the (200) reflection was composed of three maxima and the (220) had two maxima. These two phases were located along an axis that had the same interplanar spacing c for both phases, while along the other two axes each phase had its own interplanar spacing (a_1, a_2) with $a_1 > c > a_2$. Electron microscopy showed needle-like precipitates along the <100>. After tempering for 20 hrs at 800°C the presence of two bcc phases was indicated by x-rays. An oscillation x-ray pattern was shown of a Ticonal sample subjected to the thermomagnetic treatment for 12 min at 800°C. The (200) had two maxima of which the β phase reflection was more intense. The (220) and (202) reflections had two maxima each and the (310) had eight maxima, four of which corresponded to (13) reflection from β_2 and β-phases for CoK_{α_1,α_2} wavelengths. Lattice spacings (a_1, a_2, c) were given for all of the planes which were observed. The tetragonal phases were caused by the interaction of elastic stresses which occurred during the union of two isomorphic phases with different crystal lattice periods. Orig. art. has: 2 figures, 1 table.

SUB CODE: 11,20/ SUBM DATE: 03Mar66/ ORIG REF: 003/ OTH REF: 000

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